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It is thus seen that one of the features most frequently observed in mature or old streams may characterize the earliest stages of youth in a stream formed under certain conditions. Judging from available maps and reports, the Red River, near Fargo, North Dakota, affords a good example of this type of topography. It can hardly be regarded as an abnormal type, but is rather to be considered as one among a number of different types of youth, all of which are equally normal under their respective conditions of development.

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THE FIFTEENTH GERMAN GEOGRAPHICAL CONGRESS  
IN DANZIG.

BY

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The German Geographical Congress, founded in 1881 by the well-known African explorer Nachtigal, held its fiftieth meeting during Whitsuntide week in the old and honoured trade town of Danzig, which, with its historical buildings and characteristic environs, must have delighted all the visiting geographers. The local authorities made excellent arrangements for the Congress, which will rank worthily with the meetings held at Breslau in 1901 and at Cologne in 1903. The Fifteenth Congress was particularly interesting because almost all the members of the German South Polar Expedition were present to give their official account of the results of their journey. It will be remembered that the return of the German Expedition to Africa was telegraphed to the Congress at Cologne.

Five scientific sessions were held, with a special topic for each meeting. The first session on Tuesday morning was devoted to the German South Polar Expedition. Professor von Drygalski, of Berlin, the leader of the party, gave a general account of the enterprise. As is well known, the German Geographical Congress, under the leadership of Neumayer, until recently director of the German Naval Observatory in Hamburg, had worked for twenty years to bring about a renewal of Antarctic exploration. At the Geographical Congress held in Bremen (1895) the movement began to take shape. The German Reichstag, later, granted means for the building of the

*Gauss*, the Expedition's steamer. Von Drygalski said the *Gauss* was the best ship yet built for polar exploration. The equipment of the vessel and the supplies furnished were all that could be desired.

After reaching the field of labour, the *Gauss* was soon caught in the ice, and spent the winter in  $66^{\circ} 2' \text{ S. Lat. and } 89^{\circ} 38' \text{ E. Long.}$

The staff of the *Gauss* has been severely criticised because its discoveries on land were insignificant, particularly as compared with those of the English Expedition. With regard to these criticisms, von Drygalski said:

We did not go to the Antarctic for sport or sensational achievement. Our chief task was the solution of geophysical and biological problems.

The discovery of Kaiser Wilhelm II. Land was very favourable for scientific purposes. The characteristics of the Antarctic continent in climate, geology, ice, and fauna are strongly marked there. As the *Gauss* was imprisoned in the ice, 80 kilometers from the land, the opportunities for sledge journeys on land were considerably smaller than those of the English Expedition; and the uniformity of the inland ice made such investigations scientifically unremunerative. On the other hand, the sea presented an abundance of most interesting problems. Particularly fascinating was the combination of physical and biological research methods. In the future exploration of the sea, the Drygalski method of combining these researches will undoubtedly be employed.

The members of the Expedition are still engaged in compiling the results of the explorations, which will be published in one comprehensive work, under the auspices of the Government, by the Department of the Interior. The work will be edited by Professor von Drygalski, and printed by Reimer, of Berlin. There will be ten volumes of text (large 4to) and three volumes of atlases. The volumes of atlas sheets will include the records of the observations of terrestrial magnetism and meteorological phenomena, and also synoptical weather maps. Two parts have already been published. Seventy collaborators are now engaged upon the botanical, zoological, geological, and other results. It is believed that the work will be completed by 1912.

After Professor von Drygalski, other members of the Expedition spoke. Professor Vanhöffen read a paper on "Some Zoogeographical Results." We gather from it that the distribution of earthworms and allied species in the Antarctic regions may be explained, although there is no connection of the Antarctic lands with the sub-Antarctic islands and the southern ends of the continental masses farther north.

It was found that, contrary to the results of observations made in

the northern hemisphere, the so-called warm-water fauna may live in temperatures as low as  $1.9^{\circ}$  C. The fauna of the Antarctic world has its own characteristic forms, differing from those of the sub-Antarctic coasts and also from those of the deep sea lying between them.

Dr. Hans Gazert, the physician and bacteriologist of the Expedition, gave an interesting account of "The Occurrence and Activity of Bacteria in the Sea."

In the absence of Dr. Philippi, the geologist, Professor von Drygalski read his paper on "Samples from the Sea Floor and Geological-Petrographic Investigations." Many volcanic rocks were found on the mainland (Kaiser Wilhelm II. Land). The Gaussberg is, in fact, a strato-volcano, and not a mountain built up by a single genetic process.

Dr. Meinardus, the successor of the late Dr. Enzensperger (who died on Kerguelen Island), in the preparation of the meteorological results, spoke on the "Wind Conditions at the Winter Station of the *Gauss*." Entirely different from the observations of the other expeditions (the *Belgica*, the *Southern Cross*, and Swedish parties, for example), those taken at the *Gauss's* station were remarkably uniform and unchanging. East winds predominated both in persistency and strength. North winds were notably rare. Winds of a cyclonic character apparently originate over the oceanic expanse to the north, and are not föhn winds, as was at first conjectured. The uniformity of the winds suggests the probability that there may be a regular and somewhat easterly subsidence of the inland ice.

A report was presented, in conclusion, on the work of the Expedition in the field of terrestrial magnetism. The great need for further investigations in this branch of physical science was, in fact, the impelling motive for the renewal of Antarctic research, and it was on this line that Neumayer carried out the tireless agitation for which we are indebted to him. Dr. Luyken, who was stationed at Kerguelen Island, reported on the magnetic observations there, which were to serve as a basis for similar work at the winter station of the *Gauss*. The records indicate quiet conditions for the most part, while the greater disturbances (very few in number) appear to have intimate relations with seismic and volcanic phenomena.

Some remarks by Dr. Bidlingmaier, the magnetic observer of the Expedition, were particularly interesting. Attention to terrestrial magnetism has unfortunately declined since the day of Gauss. We do not yet understand the rôle which this physical force plays in our globe; and nothing is more important for the advancement of our knowledge of the earth than a solution of the problem of the secular

variation of terrestrial magnetism. As science proceeds in its search for the equivalent of the energy consumed in this secular variation, it may find the connection between this and other branches of geophysics, and begin to learn the nature of terrestrial magnetism.

If such progress as this is possible only in the distant future, because sufficient data have not yet been collected, some immediate results, according to Dr. Bidlingmaier, are possible by carrying out a complete magnetic survey of the earth's surface, by water and land, in the inexpensive way in which Gauss acquired a conception of the potentials of terrestrial magnetism; but this proposed survey would have a double product—the results from the sea on the oceanic, and those from the land on the continental potential. By means of the comparative study of both these potentials we may gain an insight into the properties of terrestrial magnetism as related to that part of the earth between the mean sea depths and the mean elevation of the land surface.

The first session of the Congress gave the members a very agreeable impression of the scientific results of the German South Polar Expedition; and the full account will be looked for with great interest.

The second session (Tuesday afternoon) was devoted to school geography. Headmaster Heinrich Fischer, of Berlin, presented a paper on the work done by the permanent Commission of Geographical Instruction. Through the efforts of the Commission, the Royal Prussian Land Survey will in future sell the large-scale topographic maps to the higher schools at a reduced price. Unfortunately, some present tendencies in education—as, for example, the “Reform Gymnasium”—are not favourable to the teaching of geography. The next three lectures illustrated methods of geography teaching, and dealt with more extended application of mathematical geography in the school course, and especially with the necessity for the introduction of geological studies.

The third session (Wednesday morning) was devoted to Vulcanology. Professor Dr. Sapper, of Tübingen, spoke on “Results of the Latest Researches Concerning Volcanic Eruptions in Central America and the West Indies in 1902 and 1903.” This lecture was beautifully illustrated.

Dr. Max Friederichsen, of Göttingen, spoke in high terms of the work of the late Alphons Stübel, the German vulcanologist. His expedition with W. Reiss to South America was made in 1868-1877. The two explorers devoted a year and a half to the volcanoes of Colombia, and four years to those of Ecuador. In Stübel's work,

the "Volcanic Mountains of Ecuador," his famous theory of volcanoes was mentioned for the first time; and this theory is universally accepted to-day in its essential features, particularly so as to "peripheral craters." More disputable points are Stübel's view that the magma itself is the seat of volcanic force, his total rejection of the theory of the connection of volcanoes with the formation of fissures, and his neglect of the factor of erosion in his treatment of the forms of volcanoes—an omission that has often been criticised.

Professor Hans Mayer, of Leipzig, the well-known explorer of Kilimanjaro, endorsed what had been said in praise and in criticism of Stübel's work. Nevertheless, no later explorer of volcanoes had even approximately made so valuable an exposition of the theories relating to volcanoes as that of Stübel. A series of interesting drawings by Stübel, now in the Grassi Museum, Leipzig, was shown.

In conclusion, Dr. Hundhausen, of Zürich, exhibited lantern-slides of many volcanoes in the Red Sea, Java, New Zealand, and Hawaii.

The fourth session had for its topic: "The Morphology of Coasts and the Formation of Dunes." The alluvial formations on the German Baltic coast were first discussed; then Dr. Solger, of Berlin, gave an interesting address "On Fossil Dune Forms on the North German Plain." Dr. Solger showed a series of inland dunes having bow-shaped outlines, the convex sides of which are turned towards the east. He holds that these bow-shaped dunes are the result of the predominance of easterly winds. These easterly winds, according to Dr. Solger's view, were most prevalent in the "diluvial" period, because anticyclonic conditions must have existed over the inland ice of that age; and on account of their "diluvial" origin, Dr. Solger calls them "fossil dunes."

The fifth session was devoted to the "Geography of West Prussia." The great hospitality of the Danzig people and the admirable excursions and entertainments prepared by the Committee of Arrangements added largely to the pleasure and success of the Congress. We refer particularly to the three-day excursion down the Vistula, from the Russian frontier to the sea, which had many interesting features from the morphological, cultural, and historical points of view. A pamphlet prepared for the occasion and an exhibition contributed to further knowledge of West Prussian geography.

All the visitors will look back to the Danzig meeting of the Geographical Congress with the greatest pleasure. The number in attendance was about 320. The next Congress will be held at Nuremberg in 1907.